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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/673,609

09/30/2003

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09/08/2006

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EXAMINER

BLACK, LINH

ART UNIT

PAPER NUMBER

2163

DATE MAILED: 09/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/673,609

Applicant(s)

WATANABE ET AL.

Examiner

LINH BLACK

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 11-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

This communication is in response to the Applicants' Response dated 6/20/06. Claims 11-26 are pending in the application. Claims 11, 16, 21, and 24 are independent claims.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Milligan et al. (US 5210866), and further in view of Bachmat et al. (6237063).

As per claims 11, 16, Milligan et al. teach:

a host computer; and a storage system storing data accessed by said host computer –  
col. 5, lines 30-34.

wherein said storage system includes a first physical storage area in a disk in said storage system, a second physical storage area in a disk in said storage system, and a

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controller accessing a disk in said storage system – fig. 1, items 103-125 (disk drive manager and disk drive subsets); col. 3, lines 13-49.

wherein said first physical storage area corresponds to a first logical volume composed of a plurality of continuous logical tracks accessed by said host computer; said host computer stores backup data in said second physical storage area corresponding to a second logical volume of the same amount of continuous logical tracks as the first logical volume, said backup data is data stored in said first physical storage area at a certain time; after said certain time, said controller updates data stored in said first physical storage area according to an access request to said first logical volume from said host computer - col. 3, lines 50 to col. 4, line 25 (in time of a physical disk drive failed, a backup disk drive from the shared pool of spare disk drives is automatically switched in place of the failed disk drive); col. 11, line 65 to col. 12, line 2 (The redundancy group is also called a logical volume or logical device. Within each logical device there are a plurality of logical tracks (should be continuous), each of which is the set of all physical tracks in the redundancy group which have the same physical track address); col. 21, line 11 col. 22, line 32.

said host computer sends a swap request to said storage system upon occurrence of a failure in a sequence of processing executed by said host computer – col. 1, line 65 to col. 2, line 9; col. 3, lines 57-60; col. 5, line 63 to col. 5, line 3; col. 6, lines 43-61.

said controller relates said second logical volume in said second physical storage area to said first logical volume in said first physical storage area according to said swap request by exchanging positional information with each other, so that said controller

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accesses said second physical storage area when said controller receives an access request to said first logical volume from said host computer – col. 5, line 63 to col. 5, line 3 (swap/switch a backup disk drive to a the failed disk drive is automatically done in which it is done by switching/exchanging the positional/address information of each other); col. 7, lines 29-66.

However, Milligan et al. do not explicitly disclose continuous logical tracks. Bachmat et al. teach physical disk storages and mirrored logical volumes – col. 3, lines 29-45; col. 4, lines 19-40; swapping logical volumes on the same physical disk storage device – col. 6, lines 29-67. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Milligan et al.'s teaching with Bachmat et al.'s teaching in order to allow the swapping/switching/exchanging logical volumes to better in load balancing as of Bachmat et al.'s teaching or in provide a spared disk drive will be switched to usage when there is a disk failed as of Milligan et al.'s teaching.

As per claims 12, 17, Milligan et al. teach:

wherein before receiving said swap request, said controller relates an ID of said first logical volume to an ID of said first physical storage area and accesses said first physical storage area according to an access request including said ID of said first logical volume received from said host computer; after receiving said swap request, said controller relates an ID of said first logical volume to an ID of said second physical storage area, and accesses said second physical storage area according to an access

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request including said ID of said first logical volume received from said host computer –  
col. 3, line 50 to col. 4, line 46; col. 7, line 30 to col. 8, line 39.

As per claims 13, 18, Milligan et al. teach:

wherein said backup data is stored in a tape medium, and said host computer stores  
said backup data from said tape medium to said second physical storage area – fig. 1;  
col. 8, line 40 to col. 9, line 20.

As per claims 14, 19, Milligan et al. teach:

wherein said storage system includes plural first physical storage areas, each of which  
corresponds to a first logical storage area in said first logical volume, and plural second  
physical storage areas, each of which corresponds to one of said plural first physical  
storage areas – fig. 6, item 605; col. 3, line 12 to col. 4, line 46; col. 11, line 47 to col.  
12, line 46.

said controller stores backup data in said plural second physical storage areas, backup  
data stored in a second physical storage area is data stored in a first physical storage  
area corresponding to said second physical storage area at a certain time – col. 5, line  
30 to col. 6, line 3; col. 21, line 11 to col. 22, line 32.

according to said swap request, said controller relates one of said plural second  
physical storage areas to a first logical storage area which corresponds to a first  
physical storage area corresponding to said one of said plural second physical storage  
areas, so that said controller accesses said one of said plural second physical storage

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areas when said controller receives an access request to said first logical storage area - col. 7, lines 29-66; col. 3, line 50 to col. 4, line 46.

As per claims 15, 20, Milligan et al. teach:

wherein before receiving said swap request, said controller relates an ID of said first logical volume to IDs of first logical storage areas and IDS of said plural first physical storage areas and accesses one of said plural first

physical storage areas according to an access request including said ID of said first logical volume and an ID of a first logical storage area - col. 3, lines 13-49.

and after receiving said swap request, said controller relates said ID of said first logical volume to said IDS of said first logical storage areas, an ID of at least one of said plural first physical storage areas, and an ID of said one of said plural second physical storage areas, and accesses said one of said plural second physical storage areas according to an access request including said ID of said first logical volume and an ID of a first logical storage area corresponding to said ID of said one of said plural second physical storage areas – col. 3, line 50 to col. 4, line 46; col. 7, line 30 to col. 8, line 39.

As per claims 21, 24, Milligan et al. teach:

at least one disk; a first physical storage area in said at least one disk, said first physical storage area is included in a logical volume composed of a plurality of continuous logical tracks accessed by said host computer, a second physical storage area included in logical volume composed of a plurality of continuous logical tracks in said at least one

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disk – col. 2, lines 55-58; col. 3, line 13 to col. 4, line 46; col. 11, line 65 to col. 12, line 2 (The redundancy group is also called a logical volume or logical device. Within each logical device there are a plurality of logical tracks (these tracks should be continuous), each of which is the set of all physical tracks in the redundancy group which have the same physical track address); col. 21, lines 11-65.

a controller coupled to said at least one disk; wherein backup data is stored in said second physical storage area, said backup data is data stored in said first physical storage area at a certain time; wherein said controller accesses said first physical storage area according to an access request to said logical volume received from said host computer - col. 3, lines 13 to col. 4, line 47; col. 21, line 11 col. 22, line 32.

after said controller receives a swap request from said host computer, said controller accesses said second physical storage area according to an access request to said logical volume received from said host computer by exchanging positional information between said first physical storage area and said second storage area with each other - col. 3, lines 50 to col. 4, line 47; col. 5, line 63 to col. 6, line 3 (swap/switch a backup disk drive to a the failed disk drive is automatically done in which it is done by switching/exchanging the positional/address information of each other); col. 7, lines 29-66.

However, Milligan et al. do not explicitly disclose continuous logical tracks.

Bachmat et al. teach physical disk storages and mirrored logical volumes – col. 3, lines 29-45; col. 4, lines 19-40; swapping logical volumes on the same physical disk storage device – col. 6, lines 29-67. Thus, it would have been obvious to one of ordinary skill in



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the art at the time of the invention to combine Milligan et al.'s teaching with Bachmat et al.'s teaching in order to allow the swapping/switching/exchanging logical volumes to better in load balancing as of Bachmat et al.'s teaching or in provide a spared disk drive will be switched to usage when there is a disk failed as of Milligan et al.'s teaching.

As per claims 22, 25, Milligan et al. teach:

wherein said controller relates an ID of said logical volume to an ID of said second physical storage area according to said swap request, so that said controller accesses said second physical storage area when said controller receives an access request including said ID of said logical volume after receiving said swap request - col. 3, lines 13-49.

As per claims 23, 26, Milligan et al. teach:

wherein said backup data is stored from a tape medium to said second physical storage area – fig. 1; col. 8, line 40 to col. 9, line 20.

### ***Response to Arguments***

Applicant's arguments with respect to claims 11-26 have been considered but are moot in view of the new ground(s) of rejection.

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**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LINH BLACK whose telephone number is 571-272-4106. The examiner can normally be reached on 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong can be reached on 571-272-1834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



LINH BLACK  
Examiner  
Art Unit 2163

September 5, 2006



UYEN LE  
PRIMARY EXAMINER